b.) Remarks

Claims 1, 3, 4, 6, and 8-18 are pending in the application.

Claims 1, 3-4, 6, 8, 10-12, 14, 16 were rejected under 35 U.S.C. 102(b) over Dixon et al. (U.S. Patent 5,760,951, "Dixon") or, in the alternative, under 35 U.S.C. 103(a) as obvious over Dixon.

The Patent Office asserted that "the use of half-wave plate and polarizer in each of the illuminating light path and/or the detecting light path in combination will cause an overall point spread function which will inherent change the axial positions of secondary maxima of the overall point spread function." The Patent Office asserted that the use of optical elements such as a polarizer and a half-wave plate inherently modifies the axial position of the PSF's secondary maxima, as claimed in Claim 1.

Applicant asserts that such a conclusion is incorrect as a matter of physics. The reasons are the following. Consider a point (or a tiny volume) located in the focal plane. The image of that point on the image plane becomes not a single point, but a point characterized by a probability distribution over a possible area in the image plane. The function characterizing that probability distribution is called the point spread function (PSF), which looks like the function in Fig. 3 of the present application. It is symmetrical relative to the principle maximum, and its lower secondary maxima are located as shown in Fig. 3.

A polarizer is an optical component that restricts the direction of oscillation of the electrical component of the electromagnetic wave to a particular direction. A polarizer doesn't create or change these oscillations, but resolves an incoming beam into polarized components and selectively does or does not transmit them.

A wave plate divides an incident polarized beam into two components, changes the phase of one relative to the other while a beam passes via the wave plate and recombines the two components as they exit the wave plate. Specifically, a half-wave plate rotates

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linearly polarized light by a certain angle (which is twice the angle of incidence of the beam onto the half-wave plate). Again, all that happens is that a direction of oscillation of the electrical component of the beam is changed.

Nothing that happens with the light beam while it passes through a polarizer or a half-wave plate in Dixon affects the probability of where a point in a focal plane will be imaged in the image plane. In other words, nothing that happens to a light beam after it passes through a polarizer or a half-wave plane in Dixon affects <u>the location of the secondary maxima</u> of its PSF, the secondary maxima remain at the locations where they were in the PSF before the beam passed through the optical components of Dixon. This is a logical result, because the probabilistic characteristics of <u>where</u> an image point can be found over a certain area on the image plane (which is determined by the location of the peaks on the PSF) is not the kind of modification of the shape of the PSF relevant to such properties as polarization, amplitude or phase, even though such properties can be modified by the optical system in Dixon.

Claim 1 is directed to a microscope with an optical element which modifies the PSF to produce a modified PSF "wherein its secondary maxima of the modified PSF are located in different axial positions" relative to those of the unmodified PSF, as shown in Fig. 4 of the present application. Optical elements of Dixon cannot produce the same result. The claimed optical element modifies <u>the location</u> of the secondary maxima of the corresponding PSF, as specifically claimed in Claim 1. An example of a transmission property of such a component is shown in Fig. 6. As explained in the specification, such an optical component exhibits, for example, locally different filter properties (paragraph [22]), or according to the description of optical properties of the component in paragraph [44]. In other words, the optical component of the present invention exhibits non-uniform (or non-homogeneous) properties, contrary to the optical components in Dixon. The cited paragraphs of the specification support the language in Claim 1 that the optical component modifies the PSF to make its secondary maxima located at different positions relative to those of the unmodified PSF. There is no such optical component in Dixon, explicitly or inherently, so the Patent Office should withdraw its rejection of Claim 1

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over Dixon under both 35 U.S.C. 102(b) and 103(a). Claim 1 should be allowed together with its dependent claims.

Claims 1, 3-4, 6, 8-12 and 14 were rejected under 35 U.S.C. 102(b), or alternatively, under 103(a) over Engelhardt (DE 199 14 049). Claims 9, 13, 15, and 16 are rejected over Engelhardt in view of Krause (U.S. 5,587,832).

Applicants respectfully disagree for the same reasons as articulated above, which are incorporated herein. Engelhard alone or in combination with Krause does not teach or suggest or mention an optical element that modifies the location of the secondary maxima of the corresponding PSF, as specifically claimed in Claim 1.

CONCLUSION

The Examiner is kindly invited to telephone the undersigned to resolve any questions to expedite the allowance of the pending Claims.

Authorization is given to charge the one month extension fee due with this response to our deposit account 502233.

Respectfully submitted,
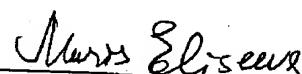
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